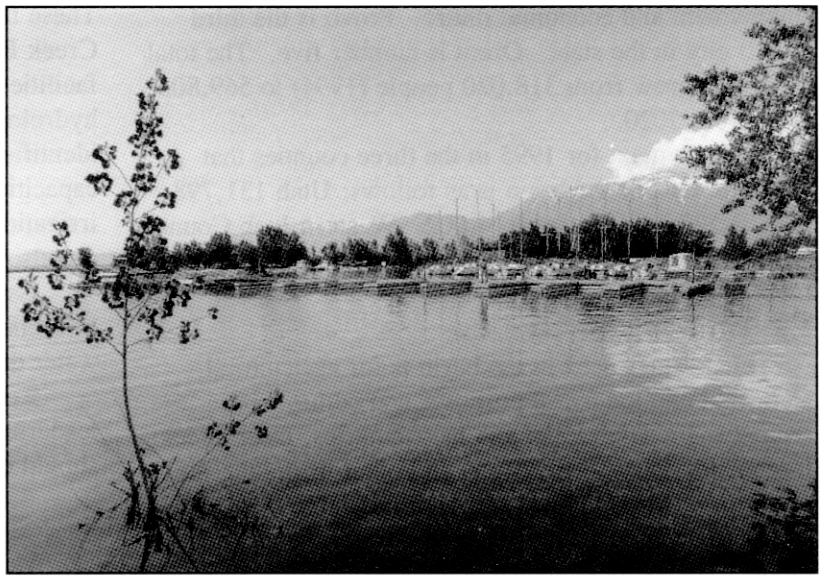
Contents

Executive Summary

The State Water Plan, published in 1990, contains 19 original sections plus two additional sections: "River Basin Summaries" and "Annual Status Report." The reader of this basin plan should refer to that document if more detail is needed on any of the subjects presented here. Headings used in the Executive Summary coincide with those used in the body of this plan and to those used in the *State Water Plan*. A glossary of acronyms, abbreviations, and definitions and a bibliography are also provided.



Utah Lake State Park

2.1 Foreword

The *State Water Plan (1990)* provides the foundation and general direction for managing waters of the state. More detailed plans are being prepared for the 11 hydrologic basins. Plans for the Bear River, Kanab Creek/Virgin River, Cedar/Beaver, Weber River, and Jordan River basins were completed between 1992 and 1997. This plan is number six.

The *Utah Lake Basin Plan* identifies the principles that guide the water planning process. In addition, it forecasts water demands through population projections then describes problems related to providing adequate water supplies, reducing shortages, improving instream flow for fish and wildlife, increasing recreation opportunities, and maintaining or improving water quality. Local, state and federal agencies have reviewed several drafts of the basin plan, as have local political and private sector leaders. Important issues are identified in this review process and solutions are recommended.

2.3 Introduction

Section 3 contains guidelines, i.e., principles and purposes, needed to insure continuity in the basin plans. It explains the organizational structure and process for reviews and for making comments at various stages. This section also describes the settlement, climate, physical characteristics and land ownership in the basin. Settled in 1849 by a few Mormon pioneers from the Salt Lake Valley, Utah County is now among the most urbanized places in Utah.

The basin sets at the base of historic Lake Bonneville in the Great Basin. It is bounded on the east by the Uinta Mountains and the Wasatch Plateau, on the west by the Oquirrh Mountains and East Tintic Mountains, and on the north by the Traverse Mountains, Wasatch Range and Uinta Mountains. The south side is bounded by the Wasatch Plateau and the Wasatch Mountains. This basin covers 1,945,100 acres of which 43 percent is owned by the federal government, 12 percent by state government. Forty-five percent is privately owned. The U.S. Forest Service is the major land management agency with 631,470 acres under its jurisdiction. Total land area managed by agencies of the federal government is 844,800 acres.

Annual precipitation ranges from 11.5 inches at Utah Lake to 25.9 inches at Timpanogos Cave and goes to 60 inches on the mountain peaks. The monthly maximum mean temperature reaches 92.7 degrees in July and a minimum mean 3.1 degrees in January.

Elevations vary between 4,475 and 11,928 feet above sea level.

Water development in this basin dates from the mid-1800s. A short history of local communities' land and water development is presented in Section 3.

2.4 Demographics and Economic Future

This section discusses the basin's population, employment and economic future. Provo is the third largest city in the state. Orem is number five. The total basin will grow from 318,020 people (1994) to 569,803 in the year 2020.

Employment for 1995 in the three counties that make up most of the basin is as follows: Utah 131,798; Juab, 2,592; and Wasatch, 4,002. Western Juab County and part of eastern Wasatch County are not in the basin.

2.5 Water Supply and Use

Most water used in the basin is for agricultural, municipal and industrial purposes and comes from groundwater, Utah Lake and its tributaries, Deer Creek, Jordanelle, Strawberry, Mona and other upstream reservoirs. Mine tunnels and high mountain lakes ornament and supplement the water supply. The average annual developed supply is 790,300 acre-feet of which 62 percent is surface water.

Jordanelle, Deer Creek and Mona reservoirs are the principal man-made features that provide regulation of the hydrologic system. The Strawberry Project, Provo River Project, and the Bonneville Unit of the Central Utah Project have greatly improved the availability of surface water for human and ecological uses. Groundwater, a growing portion of the total supply, is discussed in Section 19. Agricultural irrigation uses most of the developed water supply with 453,700 acre-feet diverted annually. Municipal and industrial users divert 141,345 acre-feet in the average year. Lawn and garden irrigation, wetlands and riparian, and instream flow uses are all discussed in Section 5. Exports from the basin and imports to the basin are also covered.

2.6 Management

Water is generally well-managed to serve the various uses. Central Utah Water Conservancy District (CUWCD), Strawberry Water Users, Provo River Water Users Association, and the Provo Reservoir Water Users Company are the primary water managers. Jordanelle Reservoir, the main municipal and industrial feature of the Bonneville Unit of the Central Utah Project, was recently completed. The Wasatch County Water Efficiency Project is nearing start of construction. Planning for the Spanish Fork Canyon-Nephi Irrigation System of the Central Utah Project is moving forward. These new projects, along with Mona Reservoir, Deer Creek Reservoir and Utah Lake, round out the major facilities providing management control of the hydrologic system. In all, 65 lakes and reservoirs are identified in Section 6 along with owners, storage capacities and uses. Names of the 52 providers of irrigation water, acres they serve and the water sources are also shown. One policy issue is discussed.

Issue - A forum does not exist for creating awareness and coordinating the planning for future water development.

Recommendation - State, district and local leaders, along with representatives of the private sector, should explore Integrated Resource Planning and evaluate its applicability to water management problems. The Central Utah Water Conservancy District should take the leading role.

Jordanelle Reservoir

2.7 Regulation/Institutional Considerations

Responsibility for water regulation rests primarily

with the Utah Division of Water Rights, and the state Department of Environmental Quality, Division of Water Quality. The State Engineer has completed a report entitled *Interim Water Distribution Plan for the Utah Lake Drainage Basin* that establishes a general framework within which that office can administer water rights in the Utah Lake Basin.

Water quality is a major concern in the highly urbanized part of the basin. Consequently, vigilance and expanded quality monitoring programs are necessary.

Dam safety has become a concern. All dams storing more than 20 acre-feet of water, and where failure may cause loss of life or significant property damage, are rated and inspected by the State Engineer. Twenty-one high hazard dams are listed in Section 7.

Agencies and organizations which fund and manage water systems are described and basin water problems and needs are explored. Water rights regulation, water quality control laws and drinking water regulations are presented along with environmental considerations.

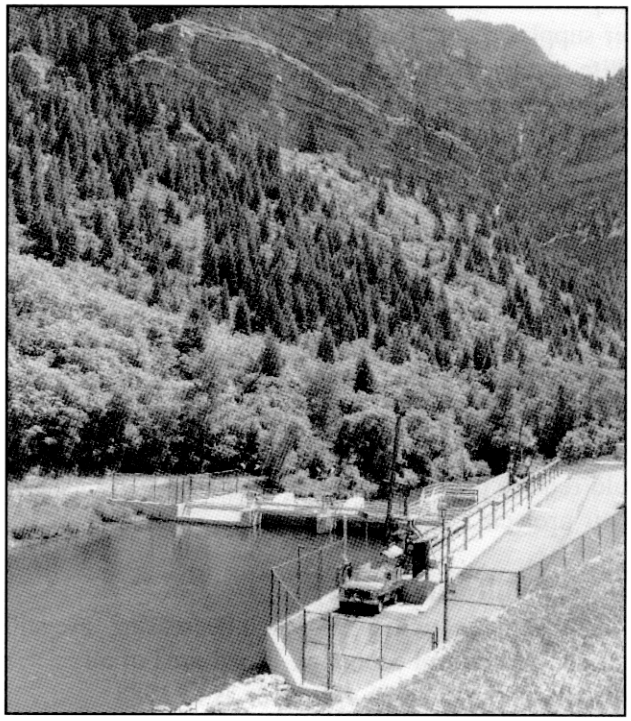
2.8 Water Funding Programs

Funding programs are available to provide both loans and grants for many types of water-related projects. Federal, state and private funding programs are described. When the Central Utah Project is completed, over $2 billion will have been spent on water projects by the Bureau of Reclamation. Agencies of state government have provided almost $113,500,000 to water system development and improvements.

2.9 Water Planning and Development

A list of the 121 water projects receiving financial assistance from the Board and Division of Water Resources is provided in Section 9. Past planning and development by irrigation, municipal and industrial water providers, including watershed planning, are presented. Several cities in the basin will receive additional water once the Bonneville Unit of the Central Utah Project is completed. Projects and programs authorized by the 1992 Central Utah Project Completion Act (CUPCA) are discussed. Matching requirements of federal CUPCA funds may dictate that a significant amount of state and local funds could be spent over the next several years.

Due to rapid urban expansion, land and water are being transferred from agriculture to urban uses. Court cases, local government decisions and state agencies' protocol have an influence on how efficiently the transition from agriculture to urban uses occurs. Development around the new Jordanelle Reservoir poses special problems for supplying water and sewer services in Wasatch County.



Olmsted diversion on the Provo River

Water use and projected demands are shown for irrigation, culinary, secondary (lawn and garden) irrigation, and wet and open areas. Alternative measures for making surface storage facilities operate more efficiently are discussed along with groundwater recharge and cloud seeding.

Environmental water needs are now a prominent element of water planning and development. The Endangered Species Act, and the presence of several endangered fishes in basin water sources, present specific problems for water suppliers. The Recovery Implementation Program is covered in detail in Section 9. Four issues of concern to the water supply community are discussed and policy recommendations provided.

Issue - Prices for water rights and shares of irrigation company stock have increased dramatically due to requirements imposed on new development and restrictions on moving water between prior use and where it is needed.

Recommendation - Local government officials should assess the long-term effects of requiring developers to donate water for new development. New water demand should be served with water acquired

from the CUP, through conservation and by interlocal agreements with nearby systems.

Issue - Utah Lake is perceived by many to have great potential for economical development of municipal water supply, recreation, transportation, fish and wildlife management, real estate and other uses.

Recommendation - Utah County should take the lead in establishing an interagency entity to oversee the preparation of a management plan for Utah Lake.

Issue - Many communities are not adequately planning for future growth.

Recommendation - All communities and/or water utilities should prepare a long-term water management plan which includes new water supply sources and water conservation programs. The plans should be reviewed and updated periodically. To encourage management and conservation planning, water funding agencies should require plans as a condition of state participation in their projects.

2.10 Agricultural Water

Agriculture activities, although decreasing, are still important to the local economy. Total area of all irrigated crop land is 166,400 acres as of 1988. Farmers produce fruit crops on nearly 10,000 acres. They produce vegetable crops, other than corn and potatoes, on 350 acres. Alfalfa is the largest crop with 37,340 acres. Dry land crops are also grown, particularly in the Juab County part of the basin.

Over 200,000 acres of arable land are not irrigated. A portion of it may be irrigated under the Bonneville Unit of the CUP. Water shortages affect agricultural production in other parts of the basin.

Farmers and ranchers have a large stake in how water rights are administered in the state. Lack of incentives for conserving water, inconsistency between how irrigators and municipalities are treated under current water law, and well metering are concerns discussed in this section.

Decisions concerning developments around Utah Lake will affect agriculture. Since the United States granted Utah ownership of the lake bed, work has been underway to decide ownership boundaries.

Issue - The ownership boundary between sovereign lands of Utah Lake and private upland is not certain.

Recommendation - The Department of Natural Resources has made the boundary negotiation a high priority. The Division of Forestry, Fire and State Lands should continue to expedite negotiations around the lake.

2.11 Drinking Water

Section 11 covers current problems and future needs of public and private water systems. Of the 140 public drinking water systems in the basin, 128 are approved by the Utah Division of Drinking Water, 10 are not approved, and two need corrective action. Towns, cities and counties all have a primary responsibility for drinking water quality control in their jurisdictions.

Verification that a public water system is meeting state and federal quality standards is made through monitoring programs established by regulations. Rules for Public Drinking Water Systems (RPDWS) outline procedures for local treatment plant operators to follow and the state's responsibilities in water quality testing. The Utah Safe Drinking Water Act and the Federal Safe Drinking Water Act, with all its amendments, are discussed as are drinking water problems associated with facility operations and groundwater contamination. Forty-seven public water systems are tabulated showing the population served, treatment type, total water use and per capita water use. Current and projected culinary water diversions for major public systems are also presented. Maintaining water quality requires the cooperation of a wide range of private and public interests. The responsibility for leadership falls mostly on local government agencies, subject to state and federal regulations.

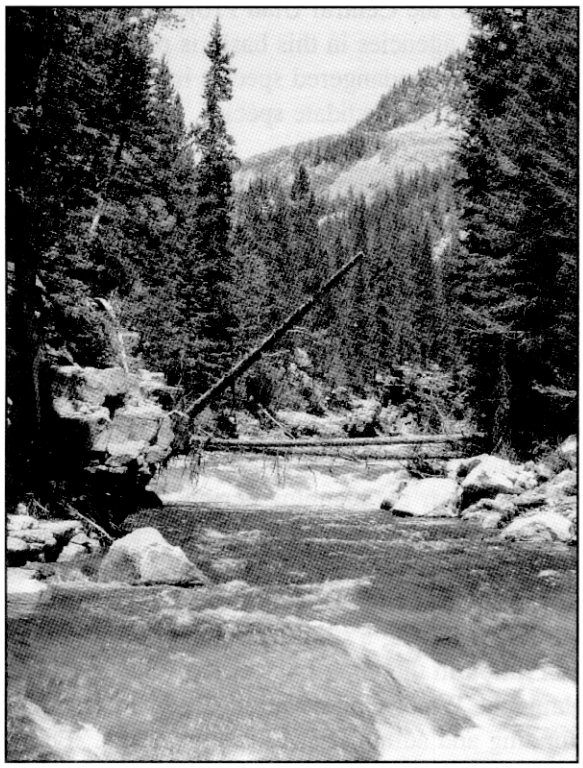
Per capita water use ranges from 110 gallons per day to 448. Heavier per capita use rates usually indicate the absence of a secondary irrigation system for lawn and garden watering or the presence of water intensive industries.

2.12 Water Quality

Five streams in the Provo River Drainage are class 1 for water quality. These streams are protected for domestic, secondary contact recreation such as boating and wading, cold water fisheries, and agricultural uses. All other streams in the drainage are class 2B. Ponds, lakes, and reservoirs in the basin have ratings of 1C at Deer Creek and Jordanelle Reservoirs (protected for domestic uses and primary contact recreation) to 2B at Utah Lake (not protected for domestic uses and primary contact recreation).

The Utah Division of Water Quality, under the Utah Water Quality Act, is responsible to adopt, enforce

and administer state and federal regulations. Limits on loading rates of various pollutants are established by state agencies using EPA guidelines.



Upper Provo River

Wastewater treatment facilities are adequate for present demand. Total design capacity is 59.63 mgd. Current average flow through these facilities is 38+ mgd. One plant at Nephi uses total containment. The Heber Valley facility disposes of waste by land application while the rest discharge effluent into streams or other water bodies. Eighteen point sources of pollution to surface water are identified as are types and sources of impairments. Four alternative measures for reducing phosphorous pollution to Utah Lake are listed. The price tag is $228 million to make significant improvement.

Issue - Runoff from urbanizing areas contributes increasing amounts of pollutants to irrigation canals.

Recommendation - Those entities responsible for storm runoff should create urban storm drain utilities or districts with authority to deal successfully with urban runoff problems.

2.13 Disaster and Emergency Response

Governments, communities and families all have a part to play in responding to emergencies. Being prepared may prevent an emergency from becoming a disaster. Local agencies are responsible for initial responses to emergencies. The National Flood Insurance Program (NFIP) makes flood insurance available to municipalities as a protection against monetary loses when flooding occurs. The Utah Division of Comprehensive Emergency Management encourages and coordinates emergency response and management planning.

Section 13 addresses flood plain zoning, watershed protection and flood control structures. Responses to drought, earthquakes and landslides are suggested. Federal, state and local organization responsibilities for responding to emergency events are given. Damages from the 1983-84 flooding are also shown.

Issue - Not all local governments have plans for managing flood plains to prevent flood damages, and some plans need to be updated.

Recommendation - Communities participating in the National Flood Insurance Program should review their local flood damage prevention ordinance to ensure they are meeting the minimum requirements for participation in the program.

Issue - Not all communities have hazard mitigation plans.

Recommendation - Local governments should prepare hazard mitigation plans with assistance from the Division of Comprehensive Emergency Management.

Issue - Not all communities have a disaster response plan.

Recommendation - Local communities should develop disaster response plans with the assistance of the Division of Comprehensive Emergency Management.

2.14 Fisheries and Water-Related Wildlife

This section describes the fish and other water-related wildlife currently found in the Utah Lake Basin. Several Class I fisheries for cold water and warm water sport fishes are available. Wildlife habitat is also abundant in the basin, but continued economic growth is in direct conflict with the needs of some species. The Utah Division of Wildlife Resources has the primary responsibility for managing the state's wildlife resources. Responsibilities of the Central Utah Water Conservancy District to augment water supplies and support fish and wildlife interests are briefly explained. The federal Fish and Wildlife Service and Bureau of Reclamation roles are also discussed. Minimum instream flows, watershed protection, stream bank

erosion and wetlands protection are the greatest needs for wildlife.

Issue - Conversion of land and water from agriculture to municipal and industrial uses impacts fish and wildlife.

Recommendation - The Division of Wildlife Resources should work closely with county and other local officials to provide programs to protect stream flows and sensitive wildlife areas from urbanization.

2.15 Water-Related Recreation

Section 15 takes the reader on a tour of the Utah Lake Basin to introduce the wealth of opportunities presented by state, federal and private recreation providers. Wasatch Mountain State Park is the most popular state park in the basin. Jordanelle State Park was booked solid for weekends when it opened in July of 1995. Nearly two million visits were recorded in five state parks in the basin in 1995. The Utah Division of Parks and Recreation is responsible for making Utah's natural resource heritage and recreation opportunities available to resident and non-resident users. Major state parks cover nearly 29,000 acres of land, 102,000 acres of water, provide 579 camping units and supported 1,899,885 visitations in 1995.

Issue - Increased recreation demand on existing facilities underscores the need for additional funding.

Recommendation - Funding recommendations provided in "Frontiers 2000" should be pursued.

Issue - Many conflicts are exacerbated by unethical behavior in recreation settings.

Recommendation - The Division of Parks and Recreation, in cooperation with other recreation agencies, should organize focus groups with recreationists and managers from throughout the state to obtain ideas and support from all members of the recreation community. People who create the conflicts should be represented and encouraged to participate.

Issue - Comprehensive planning for allocation of resources in this basin is vital.

Recommendation - The Division of Parks and Recreation should continue to implement findings of the *Deer Creek Resource Management Plan* to balance and sustain resources used for recreation.

2.16 Federal Water Planning and Development

The role of the federal government is changing from construction and development to preservation, conservation and maintenance. Federal funding is decreasing while regulatory programs are increasing.

A major reorganization has occurred in the U.S. Department of Agriculture. These changes, and the duties of new agencies are presented in Section 16. The new role of the Bureau of Reclamation is also discussed as it relates to the Central Utah Project. Involvement of other federal agencies in this basin is presented also. Threatened and endangered species in the basin are listed, along with candidate species.

2.17 Water Conservation/Education

For two generations, water has run from our taps as if by magic. Shortages in some systems, environmental problems, social values and competing uses now require us to find ways to stretch current supplies.

The Wasatch Front Demand/Supply computer model was used to project future water use in Utah County and to estimate the effect of conservation measures. Over the planning period 1995 to 2020, water usage can be reduced by 12 percent through conservation.

The Central Utah Project Completion Act (CUPCA) is having a significant effect on water conservation in the Utah Lake Basin. Section 17 explains the Water Conservation Credit Program with its funding and administrative requirements. Public education and its role in preparing Utahans for future water shortages is presented.

The Utah Water Conservation Advisory Board was created by the governor. It examined several specific policies for encouraging water education and conservation in the state. The CUPCA also required a water conservation pricing study be done to focus on ways to conserve water by reducing demand via pricing mechanisms.

Issue - Efforts to conserve water may reduce the water providers' ability to maintain adequate cash flows if precautions are not taken.

Recommendation - Agencies responsible for providing water should implement pricing practices that provide an incentive to conserve water and are revenue neutral.

Issue - Conservation strategies are only effective when water providers understand users' habits and practices.

Recommendation - Before choosing water conservation measures, water providers should conduct sufficient studies to discern and understand water users' responses to climatic and social events and conditions.

2.18 Industrial Water

Most industrial water is delivered through municipal systems. The primary exception to this is Geneva Steel where a large portion is taken from its own sources. Hydroelectric plants in the basin are listed, along with installed capacity and annual generation. Average flow through power generating facilities is 364,075 acre-feet. Over 112 Gwh of electricity are produced annually. Current industrial water use is estimated to be just over 30,000 acre-feet. This is projected to increase to over 47,000 acre-feet by the year 2020.

2.19 Groundwater

Groundwater is an important element of the hydrologic system and provides most of the drinking water. Five groundwater basins are described in Section 19. Aquifer characteristics are presented in tabular form. All groundwater basins are closed to new appropriations by the State Engineer. This should result in static water levels where groundwater withdrawals are matched over time by recharge. The State Engineer has completed a groundwater management plan for Utah and Goshen valleys. This plan, which complements the existing distribution plan and coordinated operation agreements, will provide a unified water management system.

Issue - Demand for groundwater development in Utah Valley is increasing as population expands. Because of the relationship between the groundwater and Utah Lake, this development could affect lake inflow.

Recommendation - Major water suppliers, with funding and guidance from the Central Utah Water Conservancy District and permits from the State Engineer, should aggressively pursue the possibility of large groundwater recharge projects and exchanges.

Issue - When the Wasatch County Water Efficiency Project is constructed, changes in the historic pattern of irrigation return flows to the groundwater, and to Provo River water right holders will occur.

Recommendation - The State Engineer, in consultation with local water users, the Bureau of Reclamation, and the Central Utah Water Conservancy District, should continue to insure that prior water rights on the Provo River are protected and factored into project plans. ✣ ✣